Listed below is a clean copy of amended claims and new claims. A marked-up copy of the amended claims is provided in an accompanying document.

2309. (amended) A method of treating a coal formation in situ, comprising:

providing heat from one or more heat sources to at least a portion of the formation;

allowing the heat to transfer from one or more of the heat sources to a part of the formation;

controlling the heat such that an average heating rate of the part of the formation is less than about 1 °C per day in a pyrolysis temperature range; and

controlling the heat to yield at least about 15 % by weight of a total organic carbon content of the part of the formation into condensable hydrocarbons.

2310. (amended) The method of claim 2309, wherein the one or more heat sources comprise at least two heat sources, and wherein superposition of heat from at least the two heat sources pyrolyzes at least some hydrocarbons within the part of the formation.

2311. (amended) The method of claim 2309, further comprising maintaining a temperature within the part of the formation within a pyrolysis temperature range of about 270 °C to about 400 °C.

2318. (amended) The method of claim 2309, wherein providing heat from one or more of the heat sources to at least the portion of the formation comprises:

heating a selected volume (V) of the coal formation from one or more of the heat sources, wherein the formation has an average heat capacity (C_v), and wherein the heating pyrolyzes at least some hydrocarbons within the selected volume of the formation; and

wherein heating energy/day *(Pwr)* provided to the selected volume is equal to or less than $h*V*C_v*\rho_B$, wherein ρ_B is formation bulk density, and wherein an average heating rate *(h)* of the selected volume is about 10 °C/day.

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2320. (amended) The method of claim 2309, wherein allowing the heat to transfer from one or more of the heat sources to the part of the formation increases a thermal conductivity of at least a portion of the part of the formation to greater than about 0.5 W/(m °C).

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2332. (amended) The method of claim 2309, further comprising producing a mixture from the formation, wherein the produced mixture comprises a non-condensable component, wherein the non-condensable component comprises molecular hydrogen, wherein the molecular hydrogen is greater than about 10 % by volume of the non-condensable component at 25 °C and one atmosphere absolute pressure, and wherein the molecular hydrogen is less than about 80 % by volume of the non-condensable component at 25 °C and one atmosphere absolute pressure.

2340. (amended) The method of claim 2309, further comprising:

providing hydrogen (H_2) to the heated part of the formation to hydrogenate hydrocarbons within the part; and

heating a portion of the part with heat from hydrogenation.

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2341. (amended) The method of claim 2309, further comprising:

producing hydrogen (H_2) and condensable hydrocarbons from the formation; and

hydrogenating a portion of the produced condensable hydrocarbons with at least a portion of the produced hydrogen.

2342. (amended) The method of claim 2309, wherein allowing the heat to transfer increases a permeability of a majority of the part of the formation to greater than about 100 millidarcy.

2343. (amended) The method of claim 2309, wherein allowing the heat to transfer increases a permeability of a majority of the part of the formation such that the permeability of the majority of the part of the formation is substantially uniform.

D6

2348. (amended) A method of treating a coal formation in situ, comprising:

providing heat from one or more heat sources to at least a portion of the formation;

allowing the heat to transfer from one or more of the heat sources to a part of the formation;

controlling the heat such that an average heating rate of the part of the formation is less than about 1 °C per day in a pyrolysis temperature range; and

controlling the heat to yield greater than about 60 % by weight of total condensable hydrocarbons, as measured by Fischer Assay.

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2349. (amended) The method of claim 2348, wherein the one or more heat sources comprise at least two heat sources, and wherein superposition of heat from at least the two heat sources pyrolyzes at least some hydrocarbons within the part of the formation.

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2350. (amended) The method of claim 2348, further comprising maintaining a temperature within the part of the formation within a pyrolysis temperature range of about 270 °C to about 400 °C.

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2357. (amended) The method of claim 2348, wherein providing heat from one or more of the heat sources to at least the portion of the formation comprises:

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heating a selected volume (V) of the coal formation from one or more of the heat sources, wherein the formation has an average heat capacity (C_v), and wherein the heating pyrolyzes at least some hydrocarbons within the selected volume of the formation; and

wherein heating energy/day *(Pwr)* provided to the selected volume is equal to or less than $h*V*C_v*\rho_B$, wherein ρ_B is formation bulk density, and wherein an average heating rate (h) of the selected volume is about 10 °C/day.

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2359. (amended) The method of claim 2348, wherein allowing the heat to transfer from one or more of the heat sources to the part of the formation increases a thermal conductivity of at least a portion of the part of the formation to greater than about 0.5 W/(m °C).

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2371. (amended) The method of claim 2348, further comprising producing a mixture from the formation, wherein the produced mixture comprises a non-condensable component, wherein the

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non-condensable component comprises molecular hydrogen, wherein the molecular hydrogen is greater than about 10 % by volume of the non-condensable component at 25 °C and one atmosphere absolute pressure, and wherein the molecular hydrogen is less than about 80 % by volume of the non-condensable component at 25 °C and one atmosphere absolute pressure.

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2378. (amended) The method of claim 2348, further comprising producing a mixture from the formation and controlling formation conditions by recirculating a portion of hydrogen (H_2) from the mixture into the formation.

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2379. (amended) The method of claim 2348, further comprising:

providing hydrogen (H_2) to the heated part to hydrogenate hydrocarbons within the part; and

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heating a portion of the part with heat from hydrogenation.

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2380. (amended) The method of claim 2348, further comprising:

producing hydrogen (H_2) and condensable hydrocarbons from the formation; and

hydrogenating a portion of the produced condensable hydrocarbons with at least a portion of the produced hydrogen.

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2381. (amended) The method of claim 2348, wherein allowing the heat to transfer increases a permeability of a majority of the part of the formation to greater than about 100 millidarcy.

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2382. (amended) The method of claim 2348, wherein allowing the heat to transfer comprises increasing a permeability of a majority of the part of the formation such that the permeability of the majority of the part of the formation is substantially uniform.

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5152. (amended) The method of claim 2309, wherein a pyrolysis zone is established in the part of the formation.

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5153. (amended) The method of claim 2309, wherein a pyrolysis zone is established in the part of the formation proximate to and/or surrounding at least one of the heat sources.

5154. (amended) The method of claim 2309, wherein at least one of the heat sources is disposed in an open wellbore.

5157. (amended) The method of claim 2348, wherein a pyrolysis zone is established in the part of the formation.

5158. (amended) The method of claim 2348, wherein a pyrolysis zone is established in the part of the formation proximate to and/or surrounding at least one of the heat sources.

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5159. (amended) The method of claim 2348, wherein at least one of the heat sources is disposed in an open wellbore.

SUBST)

5160. (amended) ~~A method of treating a coal formation in situ, comprising:~~

providing heat from one or more heat sources to at least a portion of the formation, wherein the heated portion of the formation is proximate one or more of the heat sources;

allowing the heat to transfer from the portion of the formation to a part of the formation;

inhibiting introduction of oxygen or air into the part when temperature in the part is in a pyrolysis temperature range;

controlling the heat to yield at least about 15 % by weight of a total organic carbon content of the part of the formation into condensable hydrocarbons.

5161. (amended) The method of claim 5160, wherein the one or more heat sources comprise at least two heat sources, and wherein superposition of heat from at least the two heat sources pyrolyzes at least some hydrocarbons within the part of the formation.

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5163. (amended) The method of claim 5160, wherein a pyrolysis zone is established in the part of the formation.

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5164. (amended) The method of claim 5160, wherein at least one of the heat sources comprises a natural distributed combustor.

5166. (amended) The method of claim 5160, wherein allowing the heat to transfer increases a permeability of a majority of the part of the formation such that the permeability of the majority of the part of the formation is substantially uniform.

D14

5167. (amended) The method of claim 5160, wherein providing heat from one or more of the heat sources to at least the portion of the formation comprises:

heating a selected volume (V) of the coal formation from one or more of the heat sources, wherein the formation has an average heat capacity (C_v), and wherein the heating pyrolyzes at least some hydrocarbons within the selected volume of the formation; and

wherein heating energy/day *(Pwr)* provided to the selected volume is equal to or less than $h*V*C_v*\rho_B$, wherein ρ_B is formation bulk density, and wherein an average heating rate (h) of the selected volume is about 10 °C/day.

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5172. (new) The method of claim 5160, further comprising providing hydrogen (H_2) to part to hydrogenate hydrocarbons within the section.

5173. (new) The method of claim 5160, further comprising producing fluid from the formation, wherein the fluid comprises hydrogen (H_2); and introducing a portion of the H_2 into the part.

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